Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

**Investigating Osmosis in Plant Cells**

**Initial Observations**

1. Make and observe a wet mount of red onion cells. Using forceps/tweezers, remove a thin layer of the red part of red onion plant and lay it flat in the drop of water. With a pipette place a drop of distilled water on the middle of the slide. Cover with a cover slip.
2. Put the slide on the stage of a microscope. Focus the slide at 4x. Then focus at 10x and observe the cells. Sketch of one of the cells AND write down descriptions (qualitative data) of what you observe.

Qualitative description of red onion cells in distilled water at 10x

Red onion cell in distilled water at 10x

1. Observe the cells at 40x.
2. Make a 10% salt solution by mixing 1 g of salt (measure using scale) with 10 mL of warm distilled water (measure with graduated cylinder).
3. Remove the wet mount of red onion in distilled water.
4. Using another slide, cover slip, and pipette, make a wet mount of red onion cells in a 10 % salt solution.
5. Put the slide on the stage of a microscope. Focus the slide at 4x. Then focus at 10x and observe the cells. Sketch one of the cells that has undergone a change due to the salt water (looks different from cells seen on distilled water wet mount.) AND write down descriptions (qualitative data) of what you observe.

Qualitative description of red onion cells in 10% salt solution at 10x

Red onion cell in 10% salt solution at 10x

1. Why did the cells change? Discuss with your lab partners why the red onion cells were changed by salt water. Write your explanation below.

**Experimental Questions**

*What is the salt (solute) concentration of red onion cells? Can you experimentally determine an approximation of this?*

**Background info**

All cells contain dissolved molecules (solutes) that make them hypertonic to most fresh water sources. Despite the proclivity for water to diffuse into plant cells, they are protected from swelling and bursting by a rigid cell wall.

However, when exposed to exterior hypertonic solutions, plant cells become hypotonic and undergo a loss of water known as plasmolysis. Because of the cytoplasmic water loss, the cell membrane will contract itself away from the cell wall. Under a microscope these plasmolyzed cells will show a circle of green chloroplasts bunched in the cell center by the shrunken cell membrane (see Figure 2 below). The cell wall remains at its original size and shape.

Figure 1: Plant cells in different solute concentrations

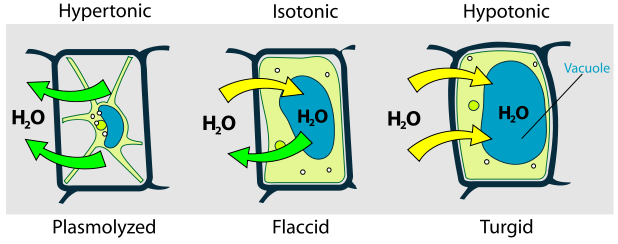
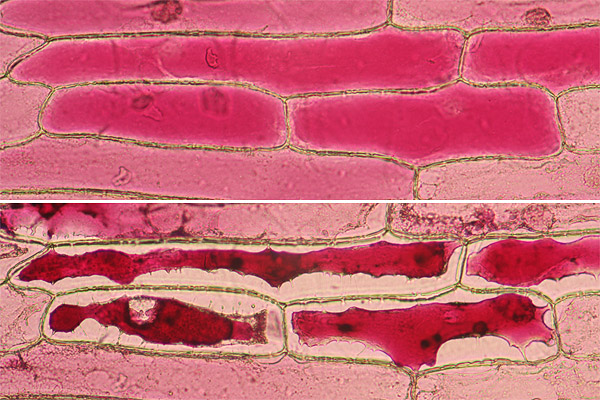


Figure 2: Normal red onion cells (top picture) vs Plasmolyzed red onion cells (bottom picture)



**Materials**

* Red onion
* Distilled water
* Pipettes
* Microscope slides
* Cover slips
* Light microscope

* Salt
* Electronic scales
* Graduated cylinder
* Paper towel
* Forceps

***Things to note***

* Often plasmolysis will only occur on some of the cell on a wet mount. Be sure to survey many cells.
* Rinse pipette between uses by pipetting some distilled water and then releasing the water.

**Procedure**

Formulate a step-by-step detailed procedure with your partners for how to best collect data to determine what salt solution (15%? 5%?, 2%?, 0.5%? etc.) is isotonic to the cell (in other words – no, or very minimal, plasmolysis occurs). Collect as much evidence as possible to support your conclusion.

**Data Table**

**Discussion and Conclusion Questions**

1. Summarize your group’s results**.**
2. What is the answer to the first experimental question? Give evidence for your answer!
3. How do your results compare to other groups’ findings?
4. Discuss any inconsistencies or errors.

**Extension Questions**

1. Explain turgor pressure. How is it important to plants?
2. Using your understanding of plasmolysis and osmosis, explain why grocery stores frequently spray the produce and vegetables with a fine mist of water.